

# A Comprehensive Nonpoint Source Field Study for Sediment, Nutrients and Pathogens in the South Fork of the Broad River Watershed in Northeast Georgia

Moving Science into Action

A Cooperative Research Project Between EPA ORD and EPA Region 4

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# PURPOSE OF PROJECT

There is an urgent need for EPA to develop protocols for establishing Total Maximum Daily Loads (TMDLs) in streams, lakes and estuaries. A cooperative TMDL field data collection project between the Office of Research and Development (ORD) and Region 4 is ongoing in the South Fork of the Broad River Watershed (SFBR). This watershed is approximately 245 square miles with just over 337 stream miles and is located in the Savannah River Basin of Northeast Georgia. It is in this area that we conduct intensive rain event stream sampling.

In 1998, the State of Georgia listed the SFBR watershed as biologically impaired. However, the source of contamination was unknown. This project is developing sampling methods and standards to measure the TMDL of bedload and suspended sediment, nitrogen, phosphorus, organic carbon and pathogenic microorganisms. A comprehensive database is being developed to field test and apply mathematical models and approaches for calculating the TMDLs in this watershed and its tributaries in a field setting not available elsewhere in the U.S.

Six stream sites have been fitted with innovative monitoring equipment for collecting data before, during, and after rain events. A weather station located in the watershed is used for collecting meteorological data. Additional data are being collected from seven other study sites with stateof-the-art rain gauges. Stream hydrographic data are being collected for stage and velocity to develop stage-discharge relationships for each sampling site which includes a continuous real-time gauging station at the watershed outlet. When the study is complete, over three hundred stream cross-sectional sites will be surveyed and samples analyzed and characterized in relation to particle size and carbon content.

### Savannah River Basin South Fork Broad River Watershed

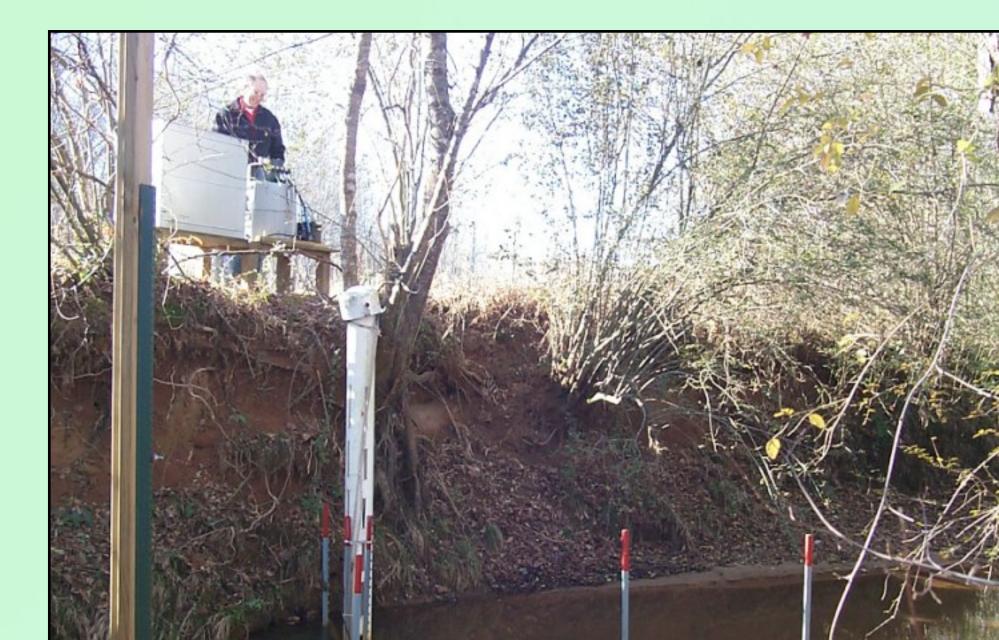


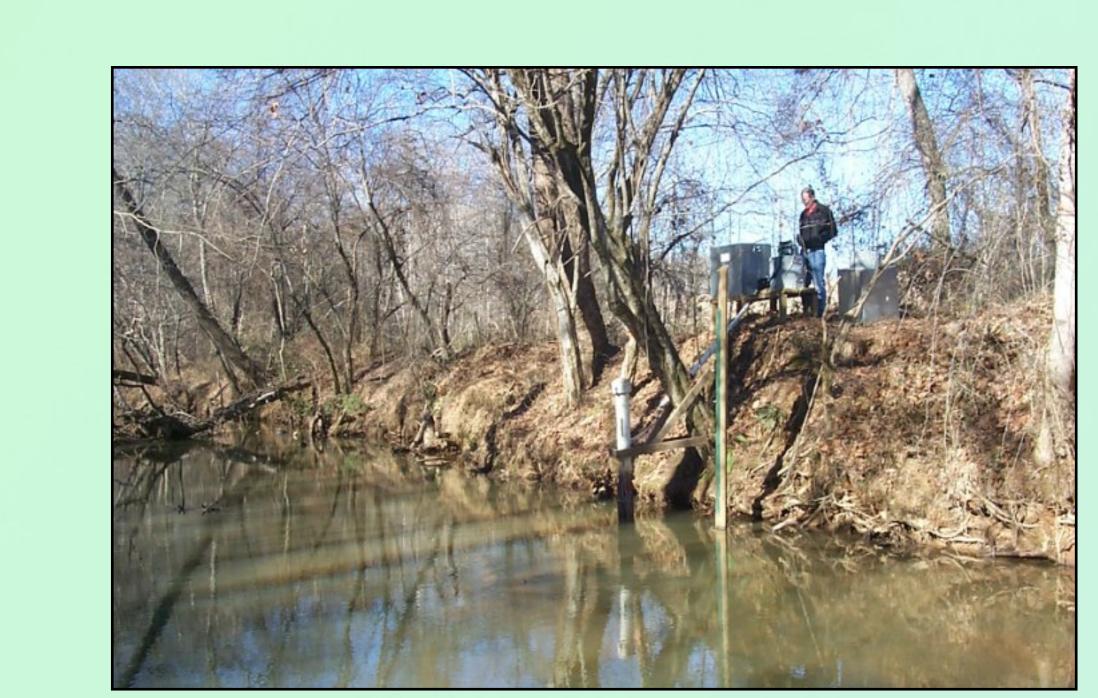
Southeast cities South Fork Broad River Watershed Savannah River Basin

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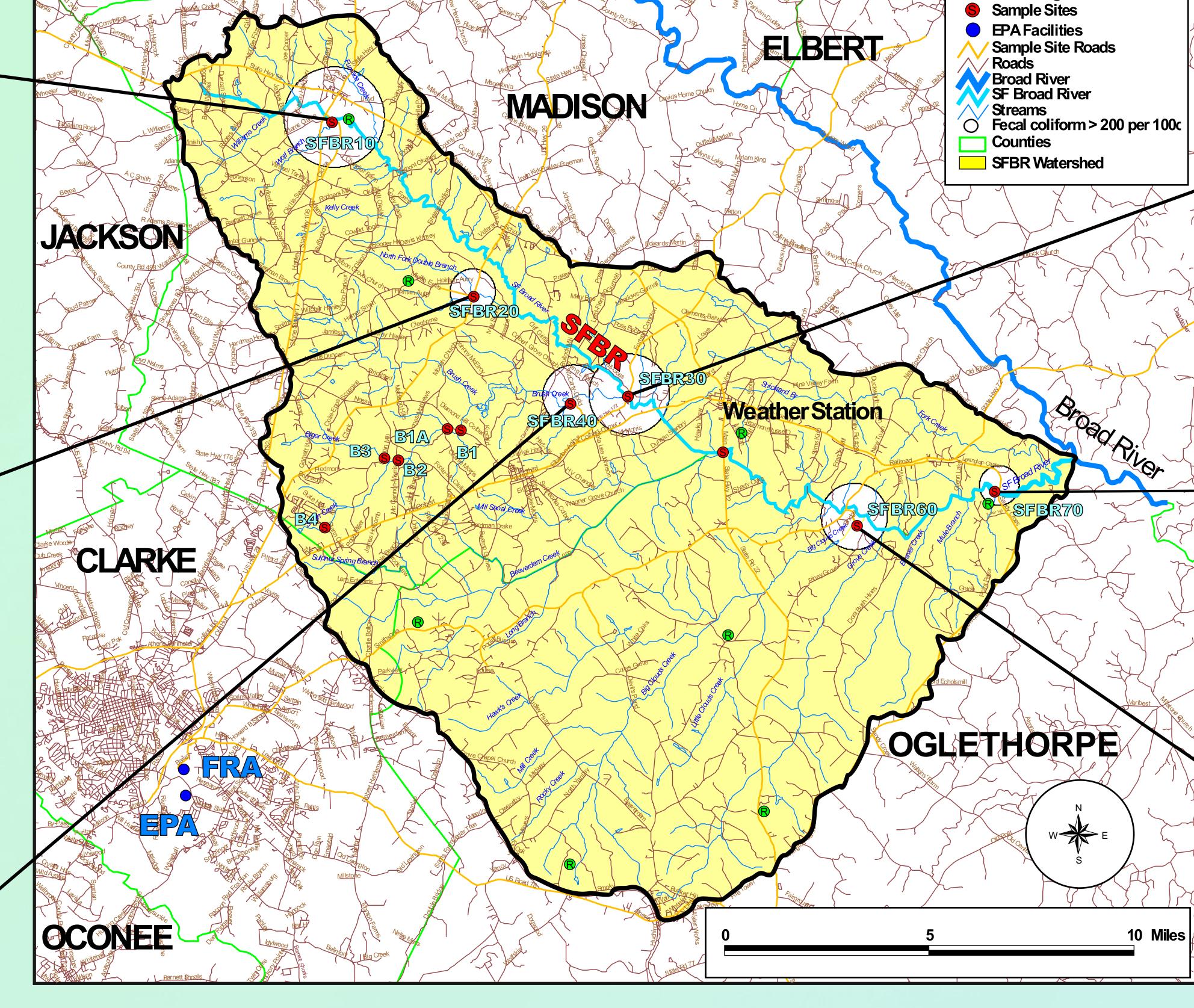












South Fork Broad River Watershed Study Area

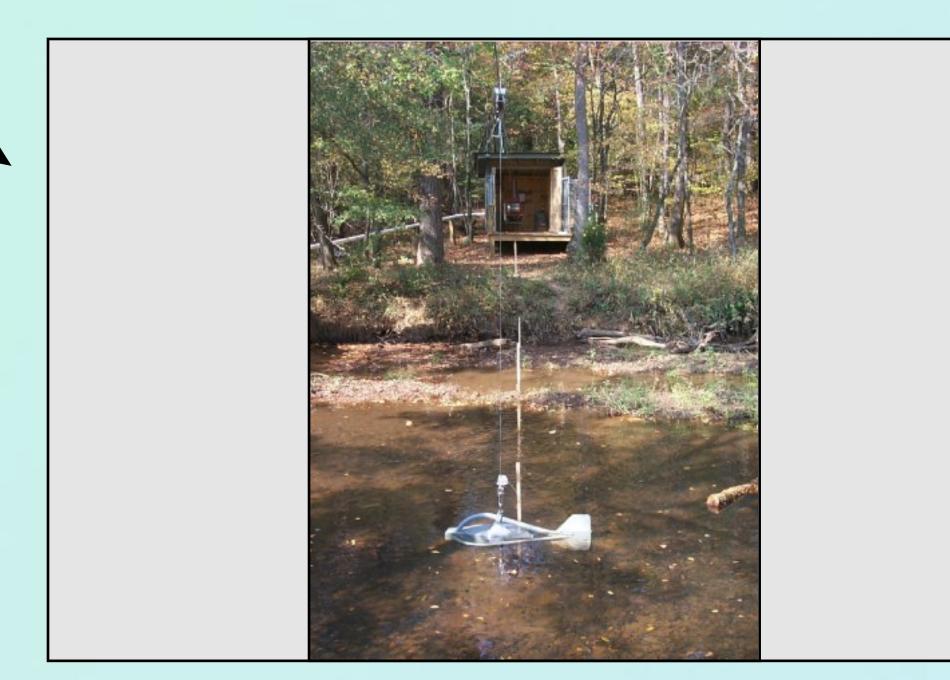
# Meteorological Measurements









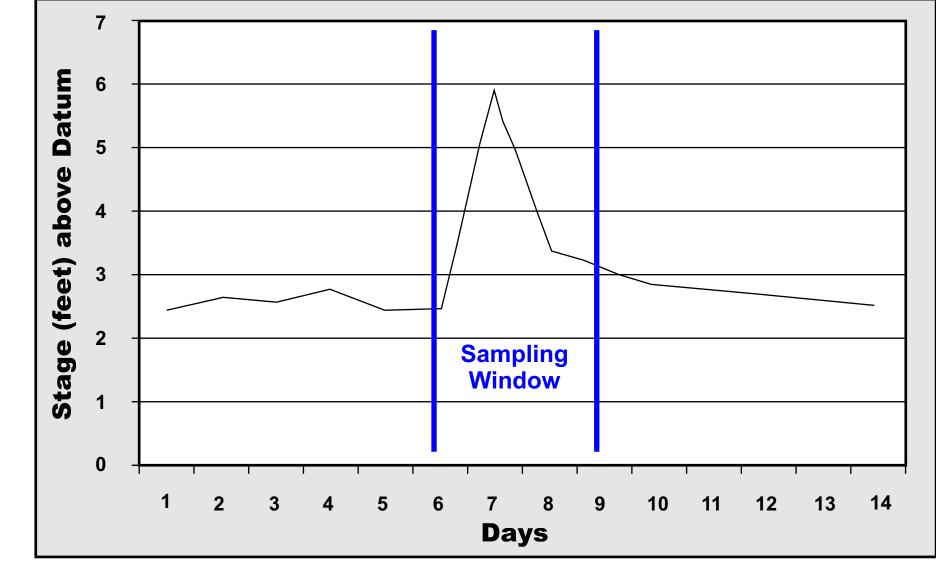


# IMPACTS OF FIELD RESEARCH

Prior to the SFBR project, there was limited scientific data available to support TMDL development. The results of the SFBR project will accomplish the following:

- 1. Provide a comprehensive dataset that allows for development, field testing, and calibration of mathematical models addressing water quality and quantity in a watershed. The dataset created in SFBR will be unique; there is no other study site with a comparable collection of data in the U.S.
- 2. Provide robust data and models that establish a scientific basis for clean sediment and pollutant TMDLs.
- 3. Provide a means of testing field and laboratory instrumentation, methodology, and development of standard operating procedures for sampling protocols, sample processing and analytical analyses.
- 4. Develop procedures for site selection, field instrumentation, maintenance and servicing, frequency of sampling, data requirements, safety and QA.

### Typical Rise in Stream Level During Rain Event



### Pollutant Loads During a Low Flow Rain Event

Site	Total	Ammonia	Nitrate	Ortho	Total	Total
	Suspended	Nitrogen	Nitrogen	Phosphorus	Phosphorus	Organic
	Sediment					Carbon
	(pounds)	(pounds)	(pounds)	(pounds)	(pounds)	(pounds)
SFBR10	4805.4	4.3	43.2	3.5	5.3	370.4
SFBR20	431.8	1.5	4.3	0.6	0.8	43.6
SFBR30	52120.3	30.9	386.7	18.5	20.0	3511.3
SFBR40	4948.9	11.0	12.0	6.5	9.4	1067.5
SFBR60	75503.5	17.6	261.1	14.2	40.0	2473.1

## ACKNOWLEDGMENTS

The authors express sincere appreciation for support of the project by EPA at the National Exposure Research Laboratory, Ecosystems Research Division (ERD), Athens, GA; at the EPA Region 4 Science and Ecosystem Support Division (SESD), Athens, GA; and at the EPA Region 4 Water Management Division (WMD), Atlanta, GA. Specifically, we acknowledge: Dr. Rosemarie C. Russo Dr. Harvey Holm, Dr. Dave Brown, Dr. Mac Long, Mr. Robert Carousel, Dr. Earl Hayter, Ms. Pam Gunter, Mr. Alan Tasker, Mr. Jimmy Pierce, Mr. Ricky Hardigree, Mr. Ed Exum, Mr. Antonio Quinones, Mr. Bill Bokey, Mr. Philip Murphy, Dr. Bruce Pruitt, Mr. Jim Greenfield and Ms. Gail

The authors gratefully acknowledge and appreciate the cooperation of several landowners for allowing stream monitoring equipment, weather station and rain gauges to be installed on their property, specifically: Mr. Lee Moon, Park Manager, Watson Mill Bridge State Park, GA Departmen of Natural Resources; Mr. Larry Edge, Georgia Department of Transportation; Mr. Gerald Kemp, Superintendent of Public Works, City of Comer; Mr. Wesley Chandler; Mr. Albert Stovall; Mr. Jack Hammond; Mr. David Spidle; Mr. Jim Wilcox; Dr. Lee Wolfe; Mr. Randy Patman; and Mr. Robert Ambrose. Without their cooperation, this study would not have been possible.

More special thanks are extended to the volunteer ERD sampling team members who participated in storm event sampling: Mr. Robert Ambrose; Dr. Roger Burke; Mr. Robert Carousel; Ms. Linda Exum; Dr. Earl Hayter; Dr. John M. Johnston; Mr. Gerry Laniak; Mr. Chris Mazur; Dr. Marirosa Molina; Dr. Brenda Rashleigh; and Dr. Melike Gurel.

We greatly appreciate the work of Integrated Laboratory Systems, Inc., who conducted stream crosssectional surveys for about 300 sites, developed longitudinal slope elevations at the stream cross sections and performed rain event sampling.

Additional special thanks are extended to the following special people: Mr. Tim Fagerburg, with the U.S. Army Corps of Engineers for his assistance in establishing the stream monitoring sites with ISCO support tables and stilling wells to house the YSI multi-probes, as well as for his technical/mechanical skills and leadership during the installation of three cableway sampling systems; Mr. Brian E. McCallum and Mr. Jack Neighbor with the U.S. Geological Survey, for their assistance in the operation and maintenance of a real-time gauging station at the SFBR70 site, and for developing stream discharge rating curves for each of the six sites; Ms Rose Kress and Linda Peyman-Dove, with the U.S. Army Corps of Engineers, for their assistance in developing a SFBR during 2000, assisting in the installation of specialized monitoring equipment at several sampling sites and the construction of wooden support structures for rain gauges, extension of cableway platforms and shelving for storage buildings at the Field Research Annex (FRA)/Laboratory.











